WHAT IS CLAIMED IS:

1. A process for the conversion of hydrocarbons containing residues or heavy distillates which may be laden with impurities into light products that may be distilled, the process comprising:

preheating a hydrocarbon load to a first temperature;

treating the load with a jet having a first amount of energy, thereby transferring at least a portion of the first amount of energy to the load and causing the load to reach an activation energy at which at least a portion of the molecules of the load split into lighter molecules;

stabilizing the load at a second temperature in a reactor, wherein the reactor is operated at a first pressure;

expanding the load at a second pressure and

passing the load through a series of extractors, at least one of the extractors being configured to demetallize the load, at least one of the extractors being configured to produce water/hydrocarbon emulsions .

2. The process of claim 1 further comprising breaking the emulsions to obtain resulting hydrocarbons and distilling the resulting hydrocarbons.

3. The process of claim 2 wherein breaking the emulsions comprises extrusion of the emulsions followed by decantation of one or more resulting hydrocarbon phases, wherein extrusion is selected from the group consisting of: forcing the emulsions through one or more screens; pouring dry sand over the emulsions; and rolling steel balls in the emulsions.

4. The process of claim 1 wherein the preheating and treating of the load are carried out in an injector that injects the load and the jet into a non-catalytic reactor,

5. The process of claim 1 wherein the jet comprises superheated steam.

6. The process of claim 5 wherein the superheated steam expands adiabatically such that the first portion of the first amount of energy is transferred mechanically and wherein, after the superheated steam expands, the steam is at the second temperature.

7. The process of claim 1 wherein the jet comprises one or more gasses selected from the group consisting of: H2O; CO2; CO; H2; and N2.

8. The process of claim 1 wherein the energy of the jet is supplied by a conventional thermal furnace.

9. The process of claim 1 wherein the energy of the jet is supplied by combustion of hydrocarbons under pressure and exposed to the air.

10. The process of claim 1 wherein the load is a finely pulverized solid.

11. The process of claim 9 wherein the load is injected using at least one pair of converging streams and wherein the jet is directed at the converging streams, and wherein the jet causes transfer of kinetic energy to the load, thereby causing shearing of the molecules of the load.

12. The process of claim 1 wherein the first pressure is selected to minimize a soaking time and a volume of the reactor.

13. The process of claim 1 wherein substantially all of the molecules of the load which are broken are each broken into two parts.

14. The process of claim 1 wherein stabilizing the load comprises reacting at least one oxygenated compound with the freshly broken molecules of the load, wherein the at least one oxygenated compound is selected from the group consisting of: H2O; and CO2.

15. The process of claim 13, wherein the ratio of oxygenated compound to carbon in the load is at least 0.7.

16. The process of claim 1 wherein passing the load through one of the series of extractors comprises mixing the load with a heavy phase, transporting the load to a stabilization chamber and decanting liquid products from the load.

17. The process of claim 1 wherein the second pressure is atmospheric pressure and the first pressure is greater than atmospheric pressure.

18. The process of claim 1 wherein the at least one extractor configured to produce water/hydrocarbon emulsions is configured to operate at 200°C.

19. The process of claim 1 wherein the at least one extractor configured to demetallize the load is configured to operate at 360°C.

20. The process of claim 1 wherein the series of extractors comprise at least a first extractor operated at a first temperature, followed by a second extractor operated at a second temperature, followed by a third extractor operated at a third temperature, wherein the first temperature is higher than the second temperature and the second temperature is higher than the third temperature, and wherein the first extractor is configured to convert residues under vacuum to distillates under vacuum, the second extractor is configured to convert distillates under vacuum to atmospheric residues, and wherein the third extractor is configured to convert heavy hydrocarbons to light hydrocarbons.

21. A device comprising:

a hollow reactor body;

one or more inlets configured to introduce a hydrocarbon feed into said reactor;

a nozzle configured to introduce a jet into said reactor to shear molecules of said hydrocarbon feed; and

one or more outlets configured to allow said hydrocarbon feed to exit said reactor body.

22. The device of claim 21, further comprising a first heater configured to preheat said feed and a second heater configured to heat said jet.

23. The device of claim 22, further comprising one or more extractors coupled to said one or more outlets and configured to demetallize said hydrocarbon feed and produce water/hydrocarbon emulsions.

24. The device of claim 23, further comprising one or more emulsion breakers configured to separate said hydrocarbons from said emulsions.

25. The device of claim 24, further comprising one or more distillation extractors configured to distill said hydrocarbons into light hydrocarbon products.